with no significant homology to sequences in the GenBank. Studies are currently underway to knockout the expression of a selection of SA induced genes in pearl millet in order to characterise their role in conferring tolerance to rust.

doi:10.1016/j.sajb.2008.01.138

Both root and shoot-derived factors plays a role in the chilling-induced inhibition of symbiotic nitrogen fixation in soybean

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Inhibition of symbiotic nitrogen fixation by chilling is a well-known phenomenon in soybean [*Glycine max* (L.) Merr.]. However, the mechanistic basis for this phenomenon, as well as genotypic variation in response intensity, has received limited attention. Nitrogenase activity and ureide content were examined in nodules of a chilling tolerant (Highveld Top) and sensitive (PAN809) genotypes exposed to dark chilling (6 °) under two sets of conditions, where both the shoots and roots were chilled (whole plant chilling, WPC), or where only the shoots were chilled (shoot chilling, SC). Following chilling stress, nitrogenase activity was inhibited by 55% and 94% for SC and WPC treatments respectively in PAN809, whereas in Highveld Top, activity was only reduced in the WPC treatment (80%). Upon rewarming during the day, inconsistent recovery of nitrogenase activity over time occurred in PAN809, compared to Highveld Top where complete recovery was obtained. The severe inhibition and lack of full recovery of nitrogenase activity led to larger reductions in nodule ureide content in the WPC treatment of PAN809 compared to the SC treatment. On a diurnal basis, ureide content in Highveld Top remained largely unaffected. Nodule sucrose levels, as well as sucrose synthase activity in PAN809 were not altered by chilling, indicating that changes in carbohydrate metabolism was not responsible for the loss of nitrogenase activity, but rather that chilling exerted direct effects on nitrogenase. However, moderate inhibition of nitrogenase activity in the SC treatment, also provided novel evidence supporting the involvement of some shoot-derived influence on nitrogenase activity.

doi:10.1016/j.sajb.2008.01.139

Does sodium chloride trigger the desiccation tolerance of *Eucalyptus grandis*?

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The hypothesis that exposure of *E. grandis in vitro* axillary buds to NaCl was associated with a cross triggering of tolerance to desiccation was tested. Shoots clusters were cultured on semi-solid medium with full-strength MS nutrient formulation (which contains 40 mM NO_3^- + 20 mM NH_4^+) and 0–150 mM NaCl, as well as modified semi- solid medium (40 mM NO_3 i.e. no NH_4^+) containing 0–150 mM NaCl. Axillary buds were isolated and dried over activated silica gel for 20–60 min. Shoot clusters were also cultured in the presence of abscisic acid (ABA [5 mg/l]), either as a pretreatment (5 days) or in combination with the standard/modified MS formulation (14 days). Results showed that as the NaCl concentration increased the *E. grandis* shoots showed increasing signs of stress. This was especially true for shoots cultured on the modified MS formulation. The addition of ABA as a pretreatment showed an increase in the number of shoot clusters that experienced no injury when cultured on the standard MS formulation, however, in the presence of the modified MS medium (40 mM NO_3) the injury increased. The addition of ABA to the nutrient medium with or without NH_4^+ (14 days) indicated that prolonged exposure to ABA had damaging effects, and this was exacerbated by the addition of NaCl. Hence, the hypothesis that NaCl acts as a cross trigger for desiccation tolerance can be rejected. Indeed *E. grandis in vitro* axillary buds are desiccation sensitive and exhibit avoidance characteristics in their response to water loss.

doi:10.1016/j.sajb.2008.01.140

Linking research to management: Restoring fynbos riparian vegetation following alien plant invasion

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Following global trends, invasive alien plants are becoming an increasingly large problem in South Africa where growing evidence links invasive alien plant transformation to declines in ecosystem integrity and services. Working for Water (WfW), with its combined aims to enhance ecological integrity, water security and social development, has been in operation since 1995. WfW has worked under the assumption that its focus ecosystems, mostly riparian, would "self repair" once the main stressor (dense stands of invasive alien trees) was removed. This assumption has been largely untested until now, and is the centre of our research on riparian vegetation management and ecosystem repair in alien plant-invaded landscapes in the Fynbos Biome. We asked 1) are the current alien-clearing practices achieving the ecosystem repair goals set by WfW to restore indigenous riparian vegetation structure, diversity and function? and 2) what are realistic restoration goals for these different situations? In tackling these questions, the aim was to identify best-practice techniques to ensure recovery after alien clearing and to produce guidelines and tools to improve management of these systems.

doi:10.1016/j.sajb.2008.01.141

Comparing plant species richness and functional diversity of natural and invaded subtropical grassland of Maputaland

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Sub-tropical grassland of the newly described Indian Ocean Coastal Belt Biome is generally considered to be anthropogenic. This grassland type is thought to be fire driven, and if fire is excluded it would probably revert to coastal forest or woodland. However, where the topsoil has been disturbed, these sites gradually become dominated by alien invasive species. Pioneer indigenous forest species are generally absent from these invaded areas. Indigenous plant species losses and functional diversity turnover per unit area was quantified for natural grassland previously transformed by alien plant invasions in the southern part of Maputaland. Thirty-two plots of 10 × 10 m were sampled at sixteen sites. At each site one plot was sampled in invaded grassland and one in natural grassland. Sixteen plots were sampled in Maputaland Wooded Grassland on dunes and sixteen in Maputaland Coastal Belt on hills. Thorough sampling of each plot during all seasons suggest, for instance, that natural sub-tropical coastal grassland has a mean indigenous species richness of 61 (n = 16) per 100 m^2. Invaded grassland have a mean species richness of 37 (n = 16) per 100 m^2. The functional diversity also changes after disturbance, with herb and graminoid dominated natural grassland becoming shrub and tree dominated. In addition, the mean number of Maputaland endemic plant species per sample plot is reduced from six in natural grassland to one in disturbed